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**Task 1 - Energy auditing a computer system & recommend how sustainability can be integrated into an upgrade**



Instruction

• Gather information to prepare the installation of an energy measuring device on a computer system

• Prepare for the installation of the device

• Configure and test the device

• Complete and document installation and test results

• Evaluate opportunities to integrate sustainable ICT projects and reduce energy consumption

**Project Resources**

Current Cost EnviR Energy Monitor

Warning: Installation is simple yet if you are in Australia, for liability reasons it is required to be carried out by a qualified electrician when in in a power switchboard.

* <http://www.smartnow.com.au/installinstructions.php>
* <http://www.smartnow.com.au/current_cost_bridge.php>

**Theory**

Complete the following notes:

1. Q: Does the Current Cost EnviR Energy Monitor comply with Electrical Safety Standards?

ANSWER:

CE Approvals,

ETSI EN 300 220-2 V2.1.1 (2006-004), EN50371 2002, EN301489-3 v1.4.1 2002-08, EN60215:1989+A1:1992+A2:1994, IEC60950-1:2001(1st Edition) and/or 60950-1:2001+A11:2004

Electrical Safety Standards varies from country to country, in Australia it also varies from state to state. Looking at the devices specifications and CE approvals and effective radiated power, we can say that this device is compliant to standards.

ACMA regulates short range spread spectrum devices following the European telecommunications standard institute ETSI EN 300 328, where the device is noted to be compliant.

Although the device is non-intrusive, it is recommended to have it installed by qualified electrical technicians.

1. Advise how you prepared the installation of Current Cost EnviR Energy Monitor

ANSWER:

The installation made was for testing and evaluations purposes only and limited by several constraints and variables, but enable us to evaluate the product and appreciate he usefulness and applicability to household, commercial and industrial use. More importantly the understanding to the basic concept us energy measurement and monitoring and how it can be applied in the real world.

EnviR energy monitor has three components

1. CT Clamp – a clip connected to an individual wire to be able to gather readings
2. Transmitter – a device that send signal to the LCD display which act as the receiver
3. LCD Display – reads out the reading from Transmitter and CT Clamp combined

Electronics devices to be measured such as laptops, monitors, web clients and server.

Used the already prepared power lead with stripped outer PVC coating to separate the three leads. As putting the clamp together on the entire lead cancels the reading.

1. Advise how you configured and tested the Current Cost EnviR Energy Monitor

ANSWER:

Safe steps and procedure has been implemented as follows

1. Connected the CT Clamp on the unplug power lead.
2. Power on the transmitter and display unit.
3. Plug the power lead to the power point.
4. Connect the loads (PC, laptop, Thin Client one at a time)
5. Monitor the reading on different variations as shown in the table.
6. Advise how you could document the installation and energy audit

(see <http://my.currentcost.com/>)

ANSWER:

The best way to appreciate the usefulness of the device to record a baseline data of the device being monitored from, power off, power on, idle and in use. In Computing devices there could still be significant variants that needs to be considered like, other computing peripherals connected and in use, network card, sound card, displays adapters, and the likes.

Recording as many variant will give us a good handle of energy consumptions or every device on different situations.

Taking the average of several trials will at least give us the indicate energy consumptions and possible savings should energy saving measures and sustainability framework be always in mind.

**Practicum**

* **Identify power consumption of a computer system under different operating conditions using the Current Cost EnviR Energy Monitor and appropriate power lead or similar energy meter.**
* **Recommendations on upgrading computer system.**

1. Record power consumption and notes e.g. range, variability, operating conditions:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Condition** | **PC power consumption**  **(watts)** | **WEB client** | **Thin client**  **Y100** | **Server** | **Notes** |
| **OFF** | 17 | .27 | .3 | 19 |  |
| **MAX BOOT** | 51 | 5.1 | 3.5 | 42 |  |
| **IDLE** | 42 | 3.4 | 3.2 | 42 |  |
| **Wordprocessing** | 36 | 5.1 | 3.3 | 44 |  |
| **Spreadsheets** | 36 | 5.1 | 3.3 | 44 |  |
| **Web browsing**  <http://news.bbc.co.uk/2/hi/programmes/click_online/default.stm> | 45 | 4.6 | n/a | n/a |  |
| **Low level music**  <http://grooveshark.com/#/s/Fall+At+Your+Feet/3KIZB0?src=5> | 44 | 6.7 | n/a | n/a |  |
| **Low level video**  <http://www.joost.com/39w1yk49/#/?video_info=33p1yw1t> | 57 | 5.2 | n/a | n/a |  |
|  |  |  |  |  |  |

1. Evaluate the extent to which sustainability could be integrated into an upgrade of the computer system. Advise your recommendations:

“LOW CARBON COMPUTING” has been a topic of researches and discussions on several for a, it first appeared in the October 2009 issue of BUSINESS OFFICER [[1]](#footnote-1), Only recently that the word “GREEN IT” has been coined to emphasize that information technology operations represent largely untapped reservoir for energy reduction. Colleges and universities are implementing to varying degrees to reduce It-related costs and energy consumption which can be broadly categorized as reflected by the Six Strategies for Cutting Virtual Carbon such as

1. Data Centre efficiency
   1. Centralization
   2. Consolidation
   3. Cooling
2. Desktop virtualization
3. Equipment
4. Power management
5. Work processes
6. Electronic Waste

Having this strategy and framework in mind, we can be guided in all IT Designs and recommendations to conform to GREEN IT or Low Carbon Computing strategy.

When upgrading computer systems we have several options to choose from depending on the readiness, willingness, commitment and organizational capability. In most cases green it solutions are cost higher in upfront cost but lower in total cost of ownership.

For argument sake, let us assume that the organization has a complete buy-in into the low carbon computing then I would recommend following the Six Strategies for Cutting Virtual Carbon written by Karla Hignite which can be found in the website

<http://www.nacubo.org/Business_Officer_Magazine/Business_Officer_Plus/Bonus_Material/Six_Strategies_for_Cutting_Virtual_Carbon.html>

Basic principles states that, the lesser the number of energy dissipation the lesser the carbon footprint is. However, when we speak of high availability, business continuity and reliability redundancy come into play. Having said that, multiple systems having same functions are implemented thus doubling the energy consumption and carbon footprint. Thus the challenge is to provide a “Highly Available and Sustainable yet low footprint solutions. These can be achieved only using energy efficient devices, virtualization technology, alternative sources of energy, power monitoring and management, efficient work processes and practise thereby reducing electronic waste.

1. (<http://www.nacubo.org/Business_Officer_Magazine/Magazine_Archives/October_2009/Low-Carbon_Computing.html>). [↑](#footnote-ref-1)